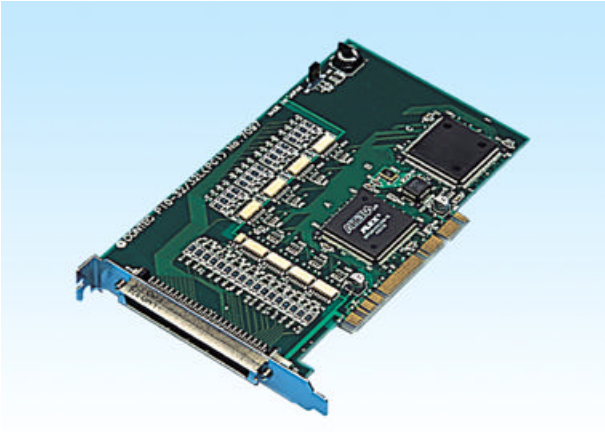
PCI Bus Opto-Isolated Digital I/O Board

PIO-32/32L(PCI)



PIO-32/32L(PCI) is a PCI bus-compatible add-on interface board designed for isolated digital input/output. Plugged in a PCI bus expansion slot on the motherboard of a personal computer, the board can input and output up to 32 channels.

Features

PIO-32/32L(PCI) performs up to 32-channel input and 32-channel output.

Common power-supply configuration in 16 channel units, capable of supporting different external power supplies.

Opto-coupler used to electrically isolated I/O signal interface from the PCI bus, offering good noise immunity.

Four input signals can also generate interrupt requests, Also capable of selecting the input signal edge for generating interrupts

Digital filtering that prevents input signal noise and chattering.

Output ability: up to 35VDC, 100mA per signal, max.

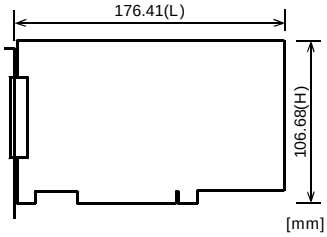
API-PAC(W32) is the library software that provides the commands for CONTEC hardware products in the form of Windows standard Win32 API functions (DLL). It makes it easy to create high-speed application software taking advantage of the CONTEC hardware using various programming languages that support Win32 API functions, such as Visual Basic and Visual C/C++.

Specification

	Item		Specification
Input			
	Type		Opto-Isolated Input (for current sinking output) (Negative logic)
	Number of Channels		32 channels (4 of these 32 can be used as interrupt signal) (16 channels with the common)
	Resister		3kΩ
	Current required to turn ON		3.4mA (Min.)
	Current required to turn OFF		0.16mA (Max.)
	Interrupts		Combine four interrupt signals to one interrupt request signal as the INTA. Either rising edge or falling edge of input signal can generate interrupt.
	Response time		1 ms (Max.)
Output			
	Type		Opto-Isolated Open Collector Output (current sinking type) (Negative logic)
	Number of Channels		32 channels (16 channels with the common)
	Rating	Voltage	35VDC (Max.)
		Current	100mA Max. per channel
	Response time		1 ms (Max.)
Common			
	I/O address		Any 32-byte boundary
	Interrupt level		1 level use/not use (select with jumper switch)
	Boards in one system		Maximum of 16 boards can be install in a same system.
	External power supply		12 to 24VDC (±15%)
	Power consumption		5 VDC 300mA (Max.)
	Operating condition		0 to 50ºC, 20% to 90% (not condensing)
	Connecting distance		50m (Typical) (depending on wiring environment)
	PCI bus specification		32bit, 33MHz, 5V
	Dimension (mm)		176.41 (L) x 106.68 (H)
	Weight		215 g

* Data “0” and “1” correspond to the High and Low levels, respectively.

Board size



The standard outside dimension (L) is the distance from the end of the board to the outer surface of the slot cover.

Support Software

API Function Library

The bundled CD-ROM "API Function Library Package API-PAC(W32)"
API-PAC(W32) is the library software that provides the commands for CONTEC hardware products in the form of Windows standard Win32 API functions (DLL).
It makes it easy to create high-speed application software taking advantage of the CONTEC hardware using various programming languages that support Win32 API functions, such as Visual Basic and Visual C/C++.
Use the installed diagnosis program to check whether the board and driver software work normally, thereby you can confirm that they have been set up correctly.
For details, refer to the help file. The help file provides various items of information such as "Function Reference", "Sample Programs", and "FAQs". Use them for program development and troubleshooting.

< Operating environment >
Support OS
Windows XP, Windows 2000 Professional, Windows NT, Windows Me/98/95
Support Language
Visual C++ Version 6.0, 5.0, 4.x, 2.0
Visual Basic Version 6.0, 5.0, 4.0
Visual C++ .NET
Visual Basic .NET
Borland C Version 5.0, 4.5x
Borland C++ Builder 6.0, 5.0
Borland Delphi 6.0, 4.0 3.0
The newest driver and download service (http://www.contec.com/apipac/) of difference file are also offered.

Library for digital I/O boards API-DIO(LNX)

It is free download service of the driver for Linux.
The API-DIO(LNX) is a library for controlling our digital I/O board in Linux.
Feature
API-DIO (LNX) offers the function group for controlling our digital I/O board by shared library and the driver of module form.
Fundamental functions, such as input and output, interrupt, trigger function and timer function are offered.
It configure the device to be used by the setting program (config) and the setting file.
A configuration program outputs the setting file that makes easy to execution environment, a driver starting script and a stop script.
The source code for user interrupt processing is included and used with a driver.
You can download updated driver software and differential files as well as sample programs available in several languages.

Accessories (Option)

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Screw Terminal : EPD-96 *1
Digital I/O 64CH Series Terminal Panel : DTP-64(PC) *1
Signal Monitor for Digital I/O(64Bits) : CM-64(PC)E *1
Screw Terminal : EPD-37 *2
Signal Monitor for Digital I/O(64Bits) : CM-32(PC)E *2
96-pin Half Pitch to 37-pin D-type (female) x 2 Connector Converter Board: CCB-96 *3

*1: The option cable PCB37P or PCB37PS is needed.
*2: The option cable PCB37W or PCB37WS is needed.
*3: The option cable PCB37P or PCB37PS or 37-pin D-type cable is needed.

Cable & Connector (Option)

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96-pin Half Pitch to 96-pin Half Pitch Shield Cable:
PCB96PS-* (1.5m, 3m, 5m)
96-pin Half Pitch to 96-pin Half Pitch Flat Cable
PCB96P-* (1.5m, 3m, 5m)
96-pin Half Pitch to 96 wires Shield Cable
PCA96PS-* (1.5m, 3m, 5m)

Product Configuration List

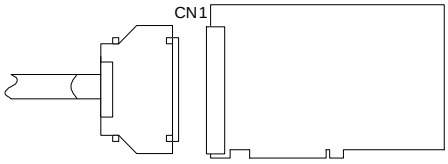
Product Configuration List

- Board[PIO-32/32L(PCI)] ... 1
- This User's Manual ... 1
- CD-ROM [API-PAC(W32)] ... 1

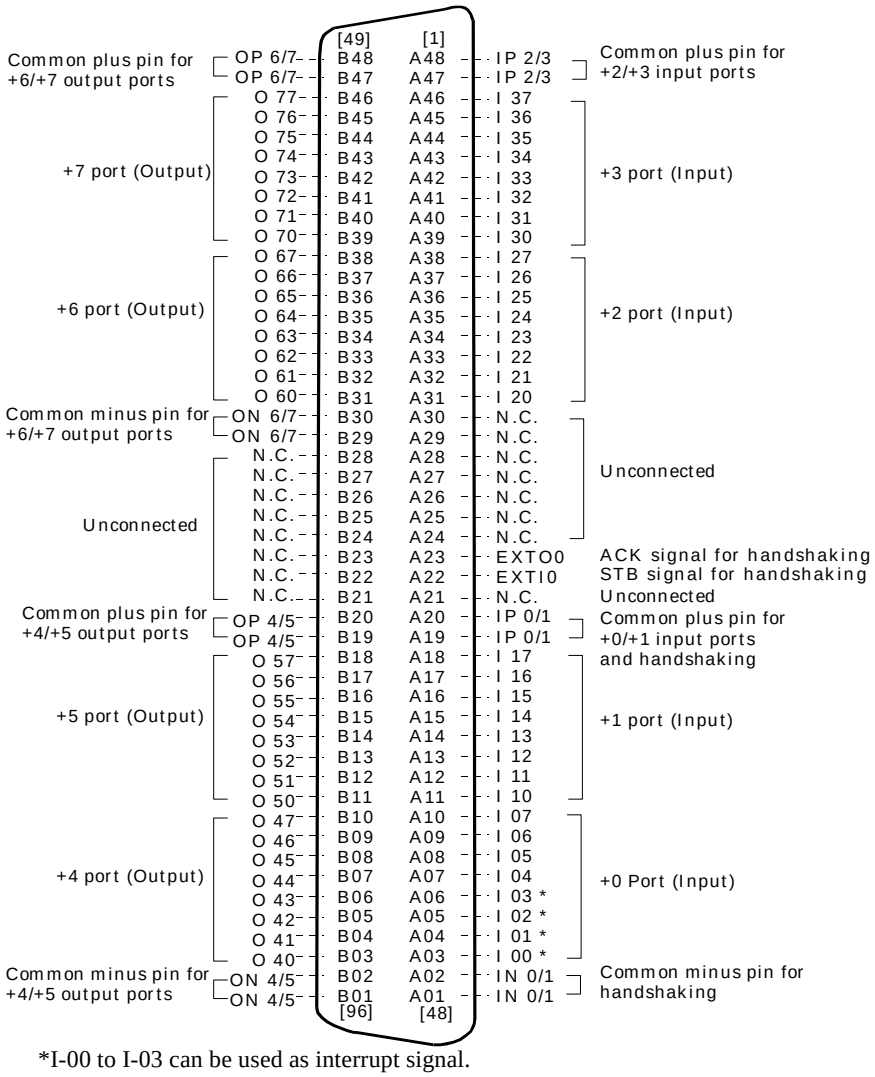
External Connection

Connecting the Interface Connector

To connect an external device to this board, plug the cable from the device into the interface connector (CN1) shown below.



Connector Pin Assignment

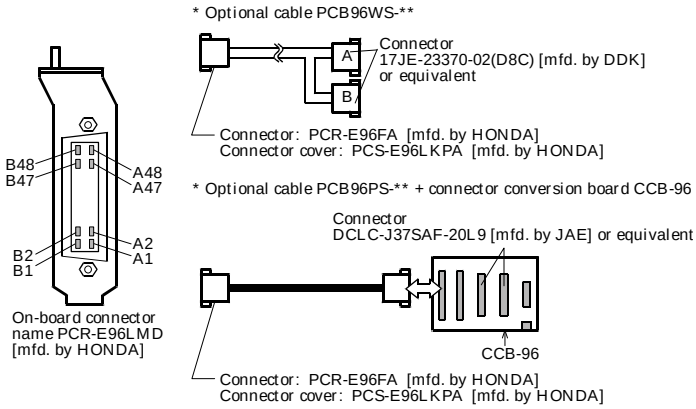

[49] [1]
Common plus pin for +6/+7 output ports
OP 6/7 B48 A48 IP 2/3
OP 6/7 B47 A47 IP 2/3
Common plus pin for +2/+3 input ports
+7 port (Output)
O 77 B46 A46 I 37
O 76 B45 A45 I 36
O 75 B44 A44 I 35
O 74 B43 A43 I 34
O 73 B42 A42 I 33
O 72 B41 A41 I 32
O 71 B40 A40 I 31
O 70 B39 A39 I 30
+3 port (Input)
+6 port (Output)
O 67 B38 A38 I 27
O 66 B37 A37 I 26
O 65 B36 A36 I 25
O 64 B35 A35 I 24
O 63 B34 A34 I 23
O 62 B33 A33 I 22
O 61 B32 A32 I 21
O 60 B31 A31 I 20
+2 port (Input)
Common minus pin for +6/+7 output ports
ON 6/7 B30 A30 N.C.
ON 6/7 B29 A29 N.C.
Unconnected
N.C. B28 A28 N.C.
N.C. B27 A27 N.C.
N.C. B26 A26 N.C.
N.C. B25 A25 N.C.
N.C. B24 A24 N.C.
Unconnected
N.C. B23 A23 EXTO0 ACK signal for handshaking
N.C. B22 A22 EXTI0 STB signal for handshaking
N.C. B21 A21 N.C. Unconnected
Common plus pin for +4/+5 output ports
OP 4/5 B20 A20 IP 0/1
OP 4/5 B19 A19 IP 0/1
Common plus pin for +0/+1 input ports and handshaking
+5 port (Output)
O 57 B18 A18 I 17
O 56 B17 A17 I 16
O 55 B16 A16 I 15
O 54 B15 A15 I 14
O 53 B14 A14 I 13
O 52 B13 A13 I 12
O 51 B12 A12 I 11
O 50 B11 A11 I 10
+1 port (Input)
+4 port (Output)
O 47 B10 A10 I 07
O 46 B09 A09 I 06
O 45 B08 A08 I 05
O 44 B07 A07 I 04
O 43 B06 A06 I 03 *
O 42 B05 A05 I 02 *
O 41 B04 A04 I 01 *
O 40 B03 A03 I 00 *
+0 Port (Input)
Common minus pin for +4/+5 output ports
ON 4/5 B02 A02 IN 0/1
ON 4/5 B01 A01 IN 0/1
Common minus pin for handshaking
[96] [48]

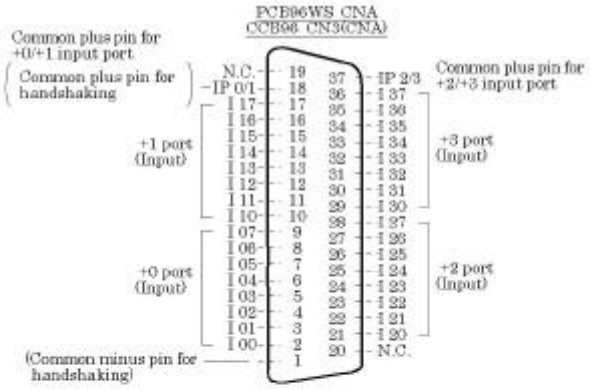
*I-00 to I-03 can be used as interrupt signal.

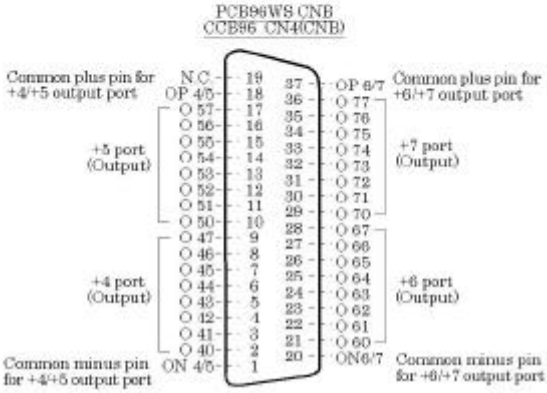
I-00~I-37	32 input signal pins. Connect output signals from the external device to these pins.
O-40~O-77	32 output signal pins. Connect input signals from the external device to these pins.
EXTO0, EXTI0	ACK signal for handshaking, STB signal for handshaking
IP 0/1~IP 2/3	Connect the positive side of the external power supply. These pins are common to 16 input signal pins.
OP 4/5~OP 6/7	Connect the positive side of the external power supply. These pins are common to 16 output signal pins.
IN 0/1	Common minus pin for handshaking
ON 4/5~ON 6/7	Connect the negative side of the external power supply. These pins are common to 16 output signal pins.
N.C.	This pin is left unconnected.

PCB96WS and CCB-96 Signal Assignments

Optional cable connectors and their corresponding signals are shown in the figure below.







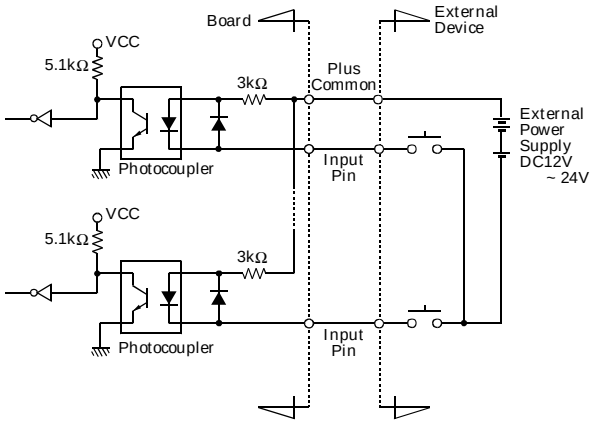
Note!

Not support signals for handshaking.

Connecting Input Signals

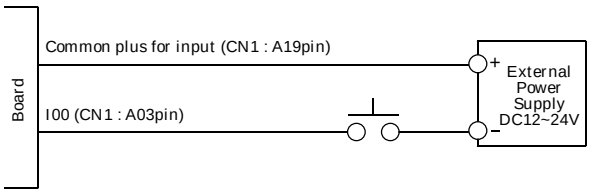
Connect the input signals to a device that can be current-driven, such as a switch or transistor output device.
The connection requires an external power supply to feed currents.
The board inputs the ON/OFF state of the current-driven device as a digital value.

Input circuit



The input circuit of this board is illustrated in the figure. The on-board photocouplers isolate internal input circuits from outside devices. The input channels are to be connected with current sinking output signals. Driving these opto-isolated circuits require an additional power supply isolated from the PC system. When a 12 VDC external power is used, each input channel will consume about 4mA current; when a 24 VDC external power supply is selected, each input channel will consume about 8 mA current.

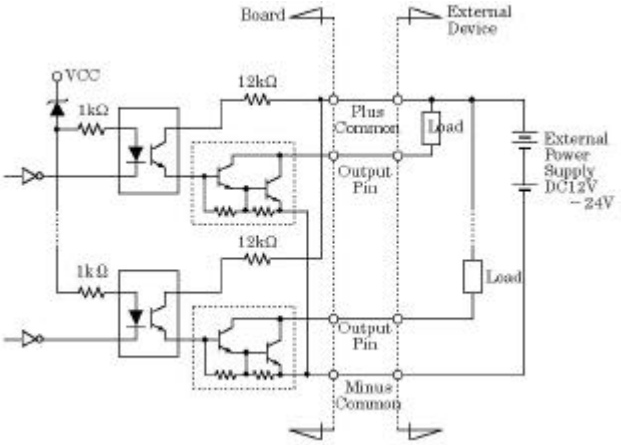
Connection examples



Connecting Output Signals

Connect the output signals to a current-driven controlled device such as a relay or LED.
The connection requires an external power supply to feed currents.
The board controls turning on/off the current-driven controlled device using a digital value.

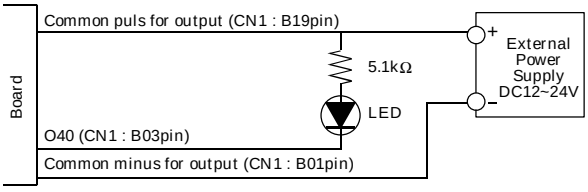
Output circuit



The output circuit of this illustrated in Figure 4.6. The output channel is a photocoupler-insulated open-collector type (sink type). Driving these opto-isolated circuits require an additional power supply isolated from the PC system. The maximum output current rating is 100mA per channel.

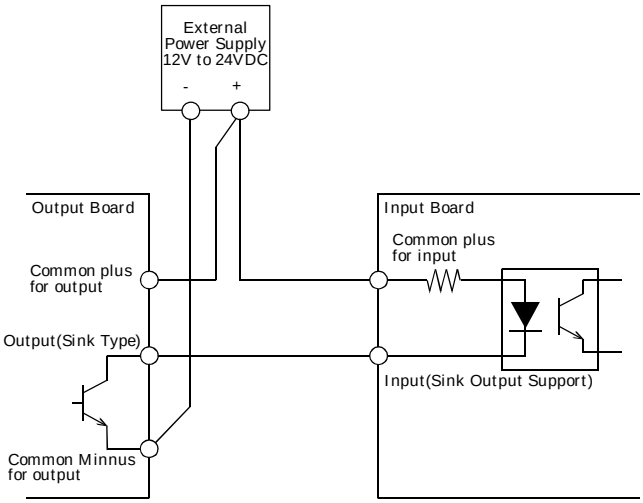
Notes!
The board has no voltage surge protection circuits for protecting output transistors. To drive inductive loads such as relays and lamps by this board, consequently a measure against voltage surge must be taken on the load side.
When the PC is turned on, all output are reset to OFF.

Example of Connection to LED



Connecting the Sink Type Output and Sink Output Support Input

The following example shows a connection between a sink type output (output board) and a sink output support input (input board). Refer to this connection example when you connect such boards to each other.



Block Diagram